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SOCK

[Socke]

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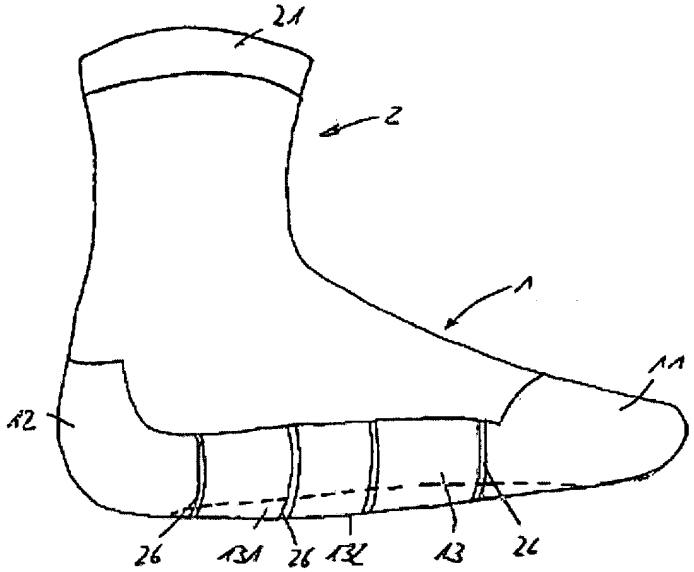


(57) Abstract: The invention relates to a sock, especially a sock which is used in sports activities. The sole has a rounded step area (13). The rounded step area (13) is advantageously dome shaped (131).

Sock

The invention relates to a sock, especially a sock which is used in sports activities.

People frequently wear solid footwear on their feet. This is particularly the case if they move much and rapidly, for example, in sports activities, particularly if the movement processes involve frequent rolling of the feet; for example, during power walking, that is when people walk for a longer duration at increased speed, the foot is exposed to high stresses, which are concentrated particularly in the area of the balls of the feet and the heel, because the sole of the foot is arched upwards. The inward arch of the sole of the foot is here directed precisely opposite the rolling motion of the foot during walking or running. The middle area of the foot, as a result of an insufficiently large application surface, or absence of an application surface, is under constant stress, which often leads to cramping. In addition, because of the uneven distribution of the load, the tendons and ligaments can be exposed to increasing stress.

The purpose of the invention is to overcome these drawbacks. The invention is based on the problem of providing a sock which provides an uneven distribution of the loads that occur in sports activities, over the entire surface area of the sole of the foot, for example, during power walking. According to the invention, the problem is solved by the fact that the sole presents a rounded stepping area.

The invention provides a sock, especially a sock which is used in sports activities, such as power walking, which provides an even distribution of the loads over the entire surface of the sole of the foot. By providing a rounded stepping area, the natural curvature of the middle of the foot is compensated and as a result a continuous application surface is achieved. Consequently, cramping in the middle area of the foot is prevented, and early fatigue of the foot is counteracted. In addition, shuffling while walking is counteracted.

In a variant of the invention, the rounded stepping area is designed in the shape of an arch. The arch is preferably directed outward. As a result, the typical rolling motion of the foot is supported during walking, particularly power walking.

In the embodiment of the invention, a climate channel is provided in the stepping area of the sock. As a result, it is possible to remove any humidity which develops in the area of the sole of the foot directly through the climate channel away from the area of the sole of the foot. The humidity can then escape through ventilation holes in the shoe.

In a variant of the invention, the application area of the sock presents a central climate channel, from which additional climate channels branch off toward the external area of the sock. As a result, a uniform climate in the stepping area is achieved. In addition, a pressure balance between the channels is achieved, which leads to a uniform dehumidification when a load is applied. In addition, the arrangement causes a pleasant sensation when stepping.

In another embodiment of the invention, the climate channel is curved or wavy. As a result, the effective channel length is increased, which results in an increase of the transport capacity, and also increases the cooling surface area in the stepping area.

In another embodiment of the invention, the channels in the stepping area are tapered. As a result of the partial tapering of the channel paths, the air moves more rapidly, which in turn accelerates the removal of the humidity from the stepping area and produces an increase in the cooling performance in this area.

It is preferred to provide an air channel on the inner and/or outer side of the leg of the sock, as desired, where the air channel in the stepping area is connected with the climate channel. As a result, an additional path is provided to remove sweat from the area of the sole of the foot.

In the case of air channels on the inner and external area of the leg, the interconnection of the air channels results in additional air circulation in the shoe.

In another embodiment of the invention, the sock presents pads. The pads can be located in different places of the sock. Their purpose is, on the one hand, to prevent skin abrasion, and, on the other hand, the risk of high pressure areas developing on the foot.

The sock is advantageously equipped with an X-Cross bandage. The X-Cross bandage supports the bone in the transition area between the leg and the foot.

Other variants and embodiments of the invention are reproduced in the remaining secondary claims. The drawing represents an embodiment example of the invention which is described in detail below. In the drawing:

Figure 1 is a representation of a sock with a rounded stepping area as well as a lateral air channel, X-Cross bandage and pads in a side view;

Figure 2 is a representation of the stepping area of the sock with climate channel (arched channel design);

Figure 3 is a representation of the stepping area of the sock with climate channel (wavy channel design);

Figure 4 is a representation of the sock represented in Figure 3 in a side view;

Figure 5 is a representation of the stepping area of the sock with climate channel (tapered channel design);

Figure 6 is the cross section along the line VI-VI in Figure 5;

Figure 7 is a representation of the stepping area of the sock with climate channel (central channel design);

Figure 8 is a representation of the stepping area of the sock with climate channel and additional air channel on the inner side of the leg;

Figure 9 is a representation of the stepping area of the sock with climate channel and additional air channel on the outer side of the leg;

Figure 10 is a representation of the stepping area of the sock with climate channel and additional air channel on the inner and outer side of the leg;

The sock which is chosen as an embodiment example (Figure 1) consists of a foot part 1 and a shaft 2. The foot part 1 presents a toe area 11, a heel area 12 and, between the toe area and the heel area, a stepping area 13. The areas 11, 12 and 13, as shown in the embodiment example, can be manufactured from reinforced material. It is also possible to use material combinations, such as, for example, virgin wool with elastic fiber materials, for example elastan.

The sock presents a rounded stepping area 13 (Figures 1 and 4). The arch 131 of the stepping area 13, which has been formed in this manner, is turned against the inward arch of the human foot sole; the arch 131 is directed outward. The arch 131 produces a rounded external contour 132. The contour 132 corresponds to the course of the rolling motion of the foot during walking and running; before the heel is put down, the foot rolls over the arch 131 along the contour 132 to the toes. In the front area of the ball of the foot and in the back area of the heel, the material is tapered to continue the rounded external contour.

The arch 131 can be produced in different manners. It is possible to produce it by padding. For this purpose, paddings of different thickness can be used. In this case, thicker paddings which are thinning at the ends are placed in the middle area. Depending on the number of paddings with different thickness, it is possible to choose gradations of thickness ranging from

fine to less fine. It is also possible to use yarns of different thickness, where the thickest yarns are sewn in the area of the maximum extent of the arch. Furthermore, the arch can be created by including a larger number of threads by knitting, where the number of threads, starting from the heel to approximately the middle of the stepping area 13, increases, and then decreases from there in the direction towards the toes. It is conceivable to produce the arch 131 in another manner.

The shaft 2 is provided on its end, which is turned toward the foot part 1, with a band 21. In the area of the calf, the shaft 2 is provided with pads 22, where stab paddings are used in the represented example; other forms of pads are possible. In the lower area of the shin, in the area of transition to the instep of the foot part, pads 23 are arranged. The arrangement of pads in the area of the Achilles heel is also possible.

In general, the pads are manufactured from synthetic yarns or compound fabrics or yarns, or similar materials. In the embodiment example, the paddings of the sock are made from hollow chamber fibers, around which wool or cotton is spun. Hollow chamber synthetic yarns have a particularly strong shock and pressure absorbing effect. The stepping area 13 can be manufactured from a microfiber knitted material, which helps to reduce abrasion. In the toe and heel area, the foot support is also made of microfibers, as needed.

In addition, the sock is equipped with an X-Cross bandage 24, which is formed from an elastic climate regulating fabric. The X-Cross bandage 24 provides support to the bone in the transitional area between the leg and the foot.

In the embodiment example, an air channel 25, which starts from the band 21, reaches the stepping area 13 and it is formed from a climate regulating crossknitted fabric. The air channel

25 contributes to the removal of humidity from the stepping area. Such an air channel 25 can also be provided on the inner side of the leg or on both sides of the sock.

Three climate channels 26 are arranged in the embodiment example according to Figure 2. The stepping area 13 is interrupted by the climate channels 26. The climate channels 26 start and end at the external edge of the stepping area; they are designed in the shape of an arc, thus increasing the effective channel length. This effect is further enhanced by the wavy pattern of the climate channel in the embodiment example according to Figure 3. By enlarging the effective channel length, the transport capacity is increased, and the cooling surface area in the stepping area is enlarged. As shown in Figure 4, the climate channels 26 can be continuous throughout the entire—reinforced—stepping area 13 of the sock, and thus they can also extend into the lateral areas which embed the foot. The climate channels 26 are formed from climate regulating crossknitted fabrics. They can be designed in such a manner that the thickness of the crossknitted fabric corresponds to the thickness of the stepping area, resulting in a continuous surface. This arrangement has a positive influence on wearer comfort.

In the embodiment example according to Figure 5, the sock, in the stepping area 13, presents climate channels 26 which are tapered in design. As a result of the partial tapering 261 of the air channel 26, the conveyance of the air is accelerated (the so-called Venturi principle). As a result, the removal of the humidity from the stepping area 13 is accelerated, on the one hand, and, the cooling performance in this area is increased, on the other hand. This advantage can be further increased if the climate channels 26 present a substantially circular cross section (Figure 6). In this design, the narrowing 261 also has an approximately circular cross section. The unclosed section of the channel 26 is denoted "b." Under a load, the separation b is reduced,

in the extreme case to b = 0, which results in a closed circular section. The climate channel 26 then is in the shape of a Laval nozzle, which considerably improves the positive properties.

In the embodiment example according to Figure 7, the stepping area 13 presents a central channel 262, from which arc-shaped climate channels 26 branch off on both sides, ending at the external edge of the stepping area 13. As a result of the central connection of the climate channels 26 through the central channel 262, a uniform climate is achieved in the entire stepping area 13. In addition, the connection results in the pressure being the same in all the climate channels 26, which in turn produces a uniform dehumidification when a load is applied. Moreover, the uniform pressure results in a pleasant stepping sensation. In a variant of the embodiment example, there is the possibility of extending the central channel 262 beyond the stepping area 13 into the toe area 11 and/or the heel area 12.

In the embodiment example according to Figure 8, three climate channels are arranged in the stepping area 13, which open into an air channel 25 on the inner side of the leg, where the air channel extends into the hollow of the foot. The climate channels 26 are arranged in a radiating pattern. As a result of this arrangement, large areas of the stepping area are reached by the climate channels 26, so that it is possible to remove humidity from the entire stepping area. The width and the length of the climate channels 26 can here be chosen freely as a rule. The number of the climate channels 26 can also be changed. By increasing the lengths or the widths of the climate channels 26 or by increasing the number of the climate channels 26, it is possible to increase the amount of humidity that can be conveyed.

In the embodiment example according to Figure 9, in a manner equivalent to Figure 8, in the stepping area 13, climate channels 26 are arranged, which open into an air channel 25,

arranged on the outer side of the leg. The climate channels 26 extend in a radiating pattern to the hollow of the foot.

In the embodiment example according to Figure 10, an air channel 25 is arranged on each inner and outer side of the leg of the sock. The stepping area 13 of the sock presents climate channels 26, which are arranged between the air channels 25 in the hollow of the foot. The number as well as the dimensions of the climate channels here too can be chosen substantially as desired. As a result of the connection of the air channel 25 on the inner side of the leg and the outer side of the leg, an optimal air circulation in the shoe is produced, so that a maximum of air humidity can be conveyed out of the shoe or out of the sock.

In addition to the embodiment example represented in the figures, other possibilities exist for the distribution and orientation of the climate channels 26 in the stepping area 13. When the term sock is used in the description and in the claims, it is not intended to limit the invention only to socks; rather, the term is also used as a general reference for stockings, panty-hose, and similar items to which the invention also relates.

Claims

1. Sock, especially for use in sports activities, characterized in that the sole presents a rounded stepping area (13).

2. Sock according to Claim 1, characterized in that the rounded stepping area (13) is designed in the shape of an arch (131).

3. Sock according to Claim 2, characterized in that the arch (131) is directed outward.

4. Sock according to one of Claims 1 – 3, characterized in that at least one climate channel (26) is provided in the stepping area (13).

5. Sock according to one of Claims 1 – 4, characterized in that the air channels (25) are provided on the inner side of the leg and/or on the outer side of the leg of the sock.

6. Sock according to one of Claim 5, characterized in that the air channels (25) in the stepping area (13) are connected with at least one climate channel (26).

7. Sock according to one of Claims 4 – 6, characterized in that the climate channels (26) in the stepping area (13) present an arc-shaped pattern.

8. Sock according to one of Claims 4 – 7, characterized in that the climate channels (26) present partial narrowings (261).

9. Sock according to one of Claims 4 – 8, characterized in that the climate channels (26) present a substantially circular cross section.

10. Sock according to one of Claims 4 – 9, characterized in that the climate channels (26) are interconnected by a central channel (262).

11. Sock according to one of Claims 5 – 10, characterized in that air channels (25) and the climate channels (26) are made of the same material.

12. Sock according to one of Claims 5 – 11, characterized in that the air channel (25) consists of a climate regulating crossknitted fabric.

13. Sock according to one of Claims 4 – 12, characterized in that the climate channel (26) consists of a climate regulating crossknitted fabric.

14. Sock according to one of Claims 1 – 13, characterized in that sock is fitted with an X-Cross bandage (24).

15. Sock according to one of Claims 1 – 14, characterized in that the sock presents pads (22, 23).

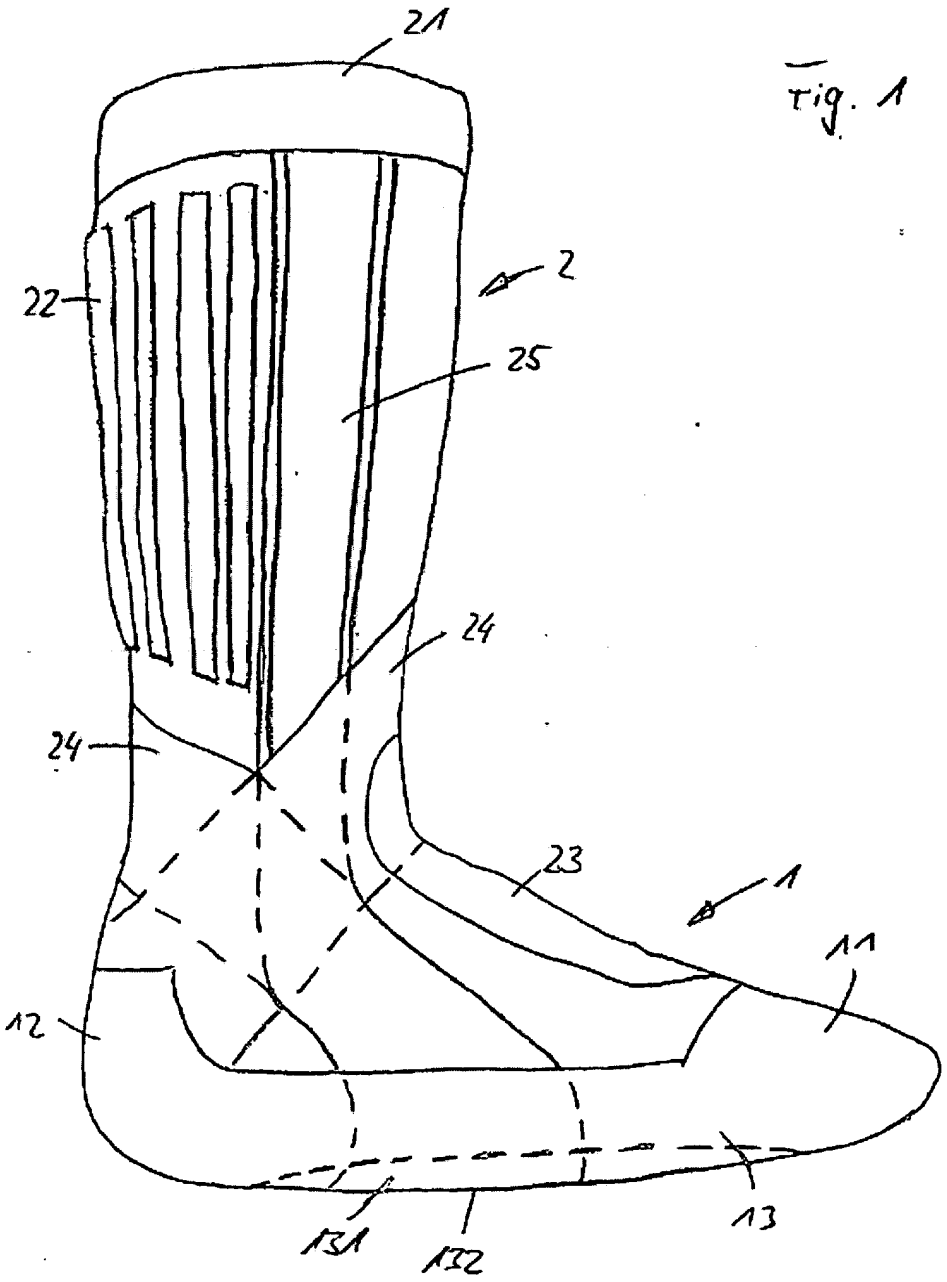


Fig. 1

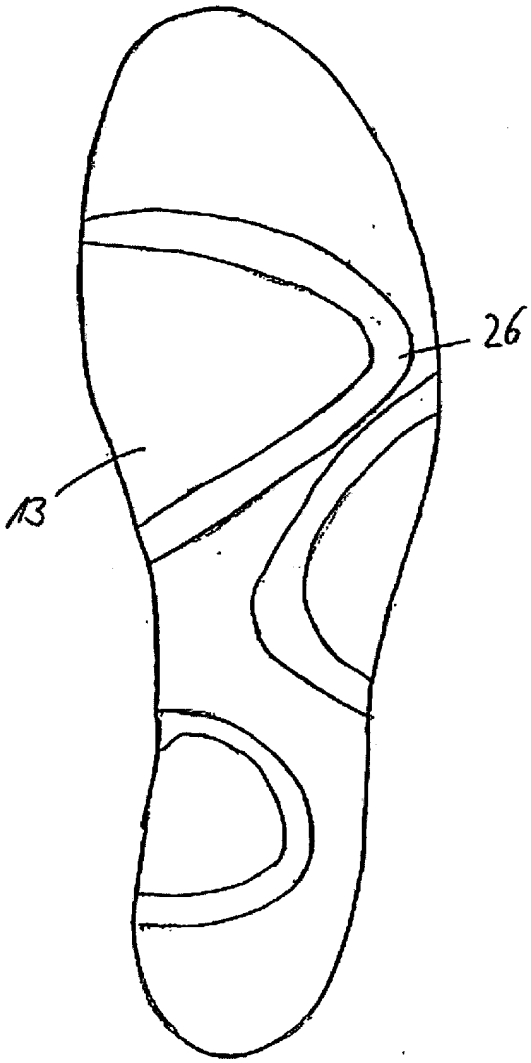


Fig. 2

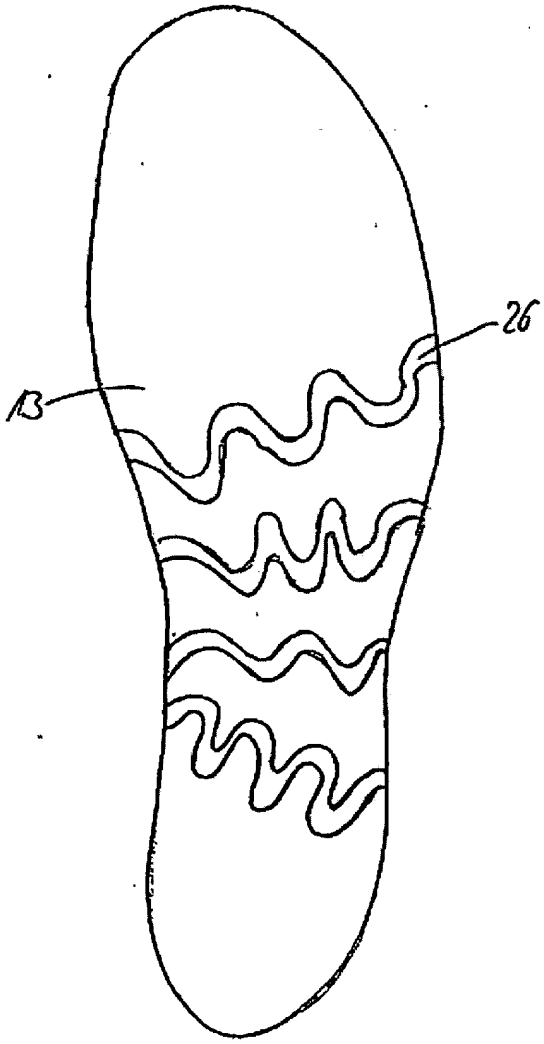
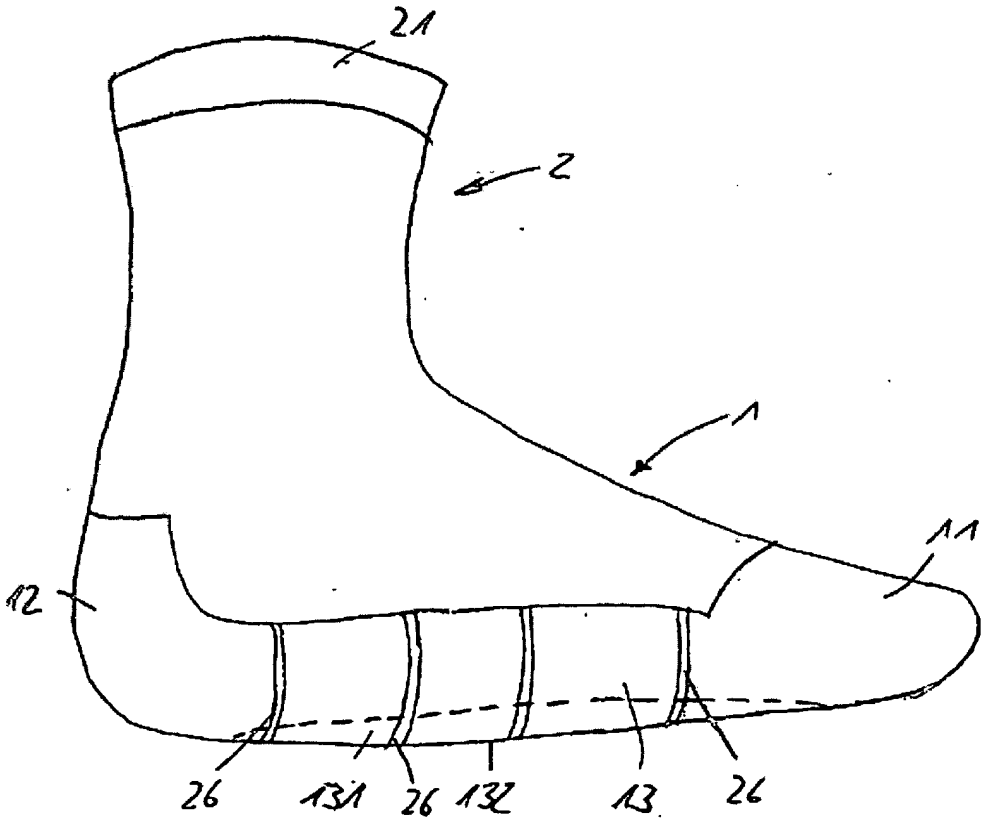


Fig. 3

Fig. 4



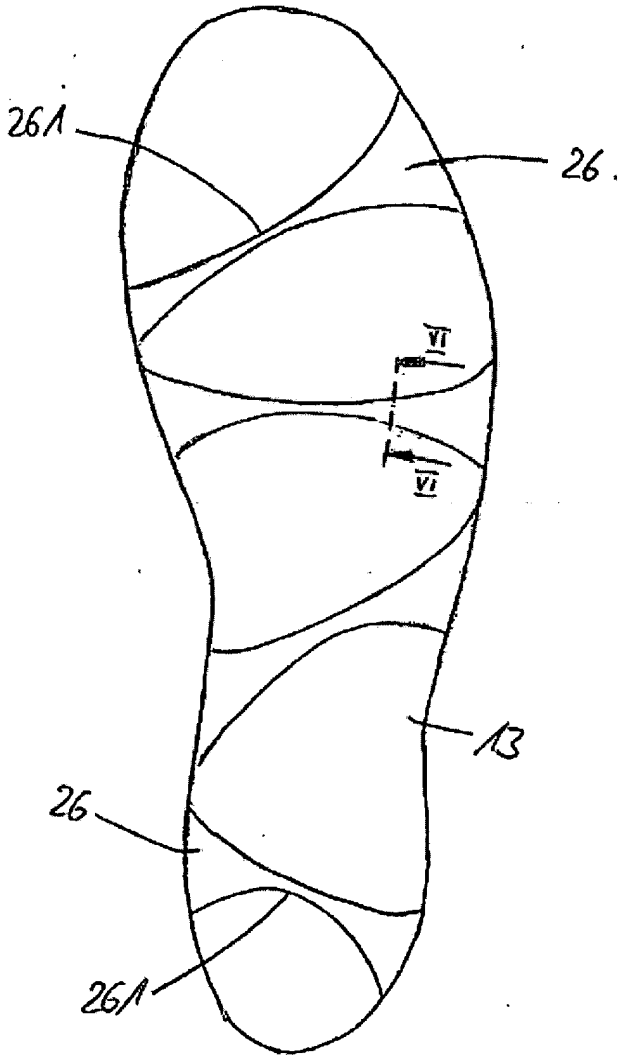


fig. 5

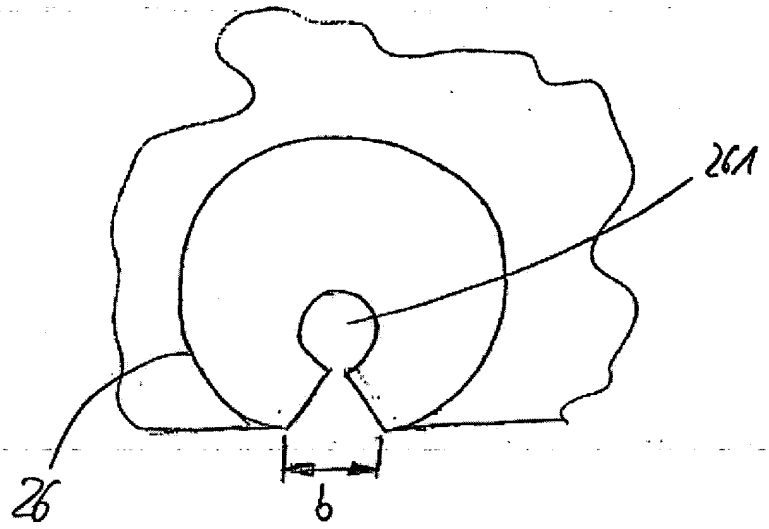


Fig. 6

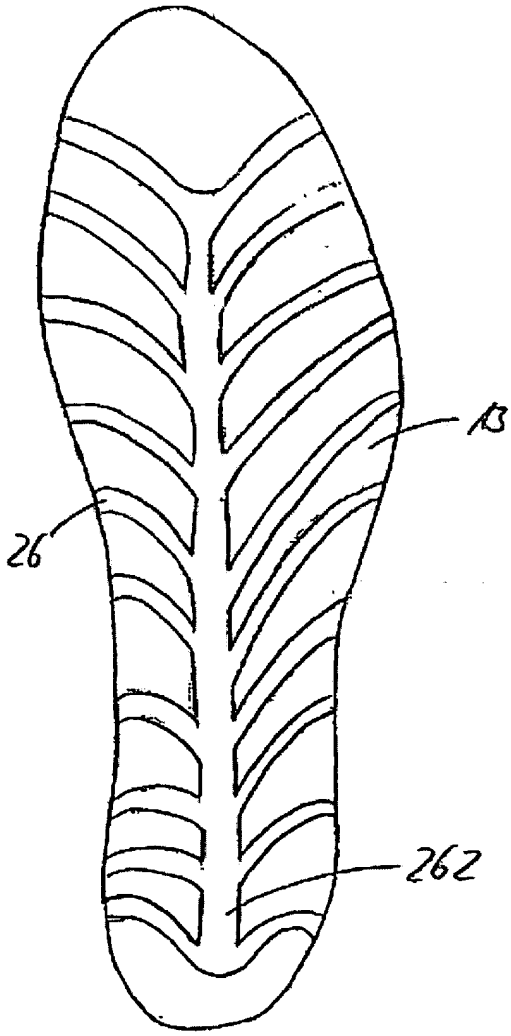


Fig. 7

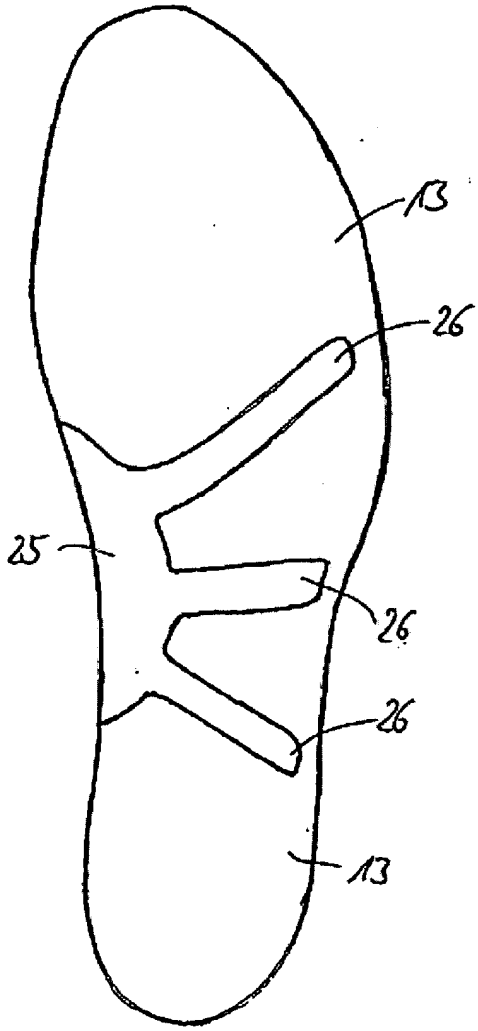


Fig. 8

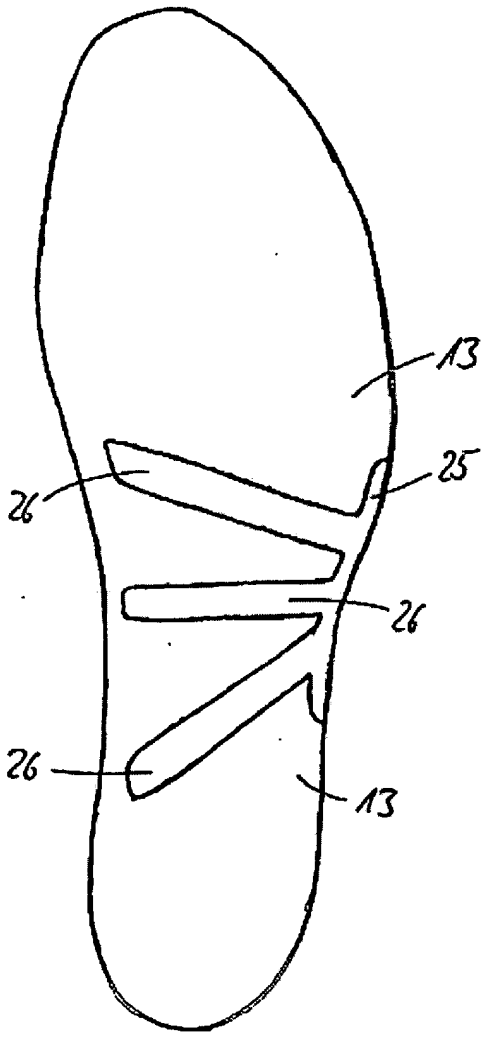


Fig. 9

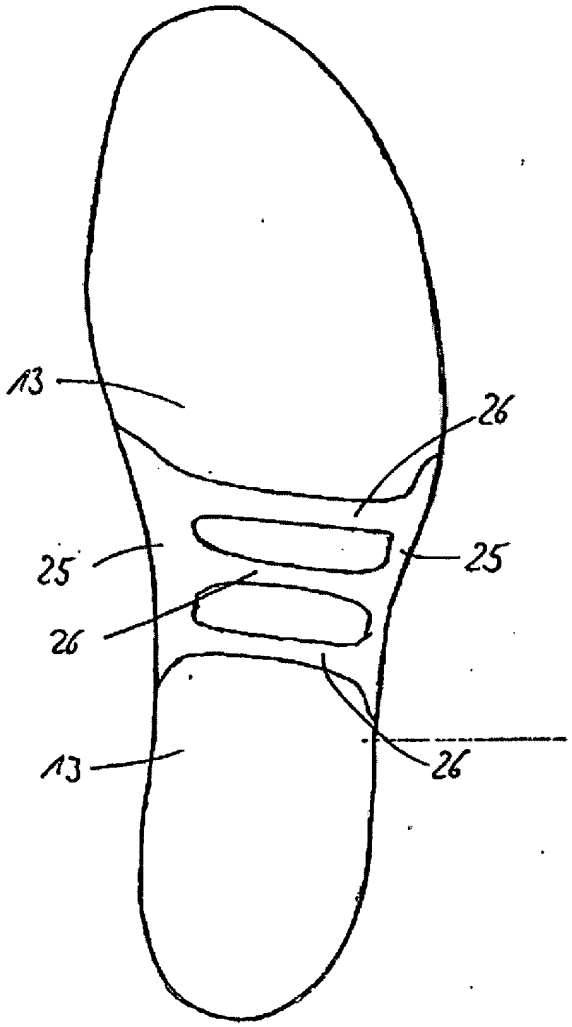


Fig. 10